Listing of Claims

Please amend claims as follows:

1. (Previously Presented) A modulator, comprising:

an adder configured to add a first nonnegative continuous-time signal and a nonnegative binary output signal to form a first nonnegative intermediate signal,

a leaky integrator operably coupled to the adder and configured to receive the first nonnegative intermediate signal and generate a second intermediate signal therefrom,

an inverting bistable device operably coupled to the integrator and configured to receive the second intermediate signal, and generate the nonnegative binary output signal therefrom, and

a feedback loop coupling the inverting bistable device and the adder to provide the nonnegative binary output signal to the adder.

2. (Original) The modulator of claim 1, wherein the modulator is an all-electronic device.

3. (Original) The modulator of claim 1, wherein the modulator is an all-optical device.

4. (Cancelled).

5. (Previously Presented) The modulator of claim 1, wherein the leaky integrator has a transfer function of $\frac{g}{s+\frac{1}{\tau}}$ where g is the gain coefficient and τ is a finite period of time.

6. (Cancelled).

7. (Cancelled).

8. (Cancelled).

9. (Original) A system, comprising the modulator of claim 1, and a computing device coupled to the modulator and being configured to adaptively modify parameters of the modulator to optimize performance.

10. (Previously Presented) The system of claim 9, wherein the computing device is configured to modify at least one of sampling frequency and input signal range.

11. (Previously Presented) The modulator of claim 1, further comprising at least one multi-level inverting bistable device.

12. (Original) The modulator of claim 1, wherein the feedback loop includes a delay.

13. (Currently Amended) A method for converting a continuous time signal to a binary signal, comprising the steps of:

receiving a nonnegative continuous time signal,

adding a nonnegative binary <u>output</u> signal to the nonnegative continuous time signal to produce a first nonnegative intermediate signal,

processing the first nonnegative intermediate signal through a leaky integrator to produce a second intermediate signal, and

processing the second intermediate signal through an inverting bistable device to produce the nonnegative binary <u>output</u> signal.

14. (Previously Presented) The method of claim 13, further comprising the step of modulating a light signal with the nonnegative continuous time signal.

15. (Original) The method of claim 13, further comprising the step of adaptively adjusting at least one of input signal range and sampling interval.

16. (Currently Amended) A modulator comprising:

an amplifier configured to amplify a continuous-time signal,

an optical isolator configured to receive a light signal,

an electro-optic modulator coupled to the optical isolator and the continuous-time signal amplifier, the electro-optic modulator configured to receive the amplified continuous-time signal and modulate the light signal thereby,

a <u>first</u> fiber-optic coupler configured to add the modulated light signal and a feedback signal,

a leaky integrator configured to generate an integrated signal from output of the first fiber-optic coupler,

an inverting bistable device configured to generate a binary signal from the integrated signal, and

a ~~second optical~~ <u>second fiber-optic</u> coupler coupled to the inverting bistable device configured to provide a binary output signal and the feedback signal.

17. (Original) The modulator of claim 16, wherein the leaky integrator is configured to provide exponential decay of optical density.

18. (Original) The modulator of claim 17, wherein the bistable device is a multiple quantum well device.

19. (Currently Amended) The modulator of claim 16, wherein the amplifier, the optical isolator, the fiber-optic couplers ~~coupler~~, the leaky integrator, the bistable device, and the feedback loop are contained on a single chip.

20. (Original) The modulator of claim 16, further comprising a second leaky integrator coupled to the bistable device.

21. (New) A modulator, comprising:

an adder configured to add a first nonnegative continuous-time signal and a nonnegative binary output signal to form a first nonnegative intermediate signal,

a leaky integrator operably coupled to the adder and configured to receive the first nonnegative intermediate signal and generate a second intermediate signal therefrom, wherein the leaky integrator has a transfer function of $\frac{g}{s+\frac{1}{\tau}}$ where g is the gain coefficient and τ is a finite period of time,

an inverting bistable device operably coupled to the integrator and configured to receive the second intermediate signal, and generate the nonnegative binary output signal therefrom, and

a feedback loop coupling the inverting bistable device and the adder to provide the nonnegative binary output signal to the adder.

22. (New) A system, comprising:

an adder configured to add a first nonnegative continuous-time signal and a nonnegative binary output signal to form a first nonnegative intermediate signal,

a leaky integrator operably coupled to the adder and configured to receive the first nonnegative intermediate signal and generate a second intermediate signal therefrom,

an inverting bistable device operably coupled to the integrator and configured to receive the second intermediate signal, and generate the nonnegative binary output signal therefrom,

a feedback loop coupling the inverting bistable device and the adder to provide the nonnegative binary output signal to the adder, and

a computing device coupled to the modulator and being configured to adaptively modify parameters of the modulator to optimize performance.

23. (New) The system of claim 22, wherein the computing device is configured to modify at least one of sampling frequency and input signal range.

24. (New) A modulator, comprising:

an adder configured to add a first nonnegative continuous-time signal and a nonnegative binary output signal to form a first nonnegative intermediate signal,

a leaky integrator operably coupled to the adder and configured to receive the first nonnegative intermediate signal and generate a second intermediate signal therefrom,

an inverting bistable device operably coupled to the integrator and configured to receive the second intermediate signal, and generate the nonnegative binary output signal therefrom, and

a feedback loop coupling the inverting bistable device and the adder to provide the nonnegative binary output signal to the adder, wherein the feedback loop includes a delay.

25. (New) A method for converting a continuous time signal to a binary signal, comprising the steps of:

receiving a nonnegative continuous time signal,

adding a nonnegative binary output signal to the nonnegative continuous time signal to produce a first nonnegative intermediate signal,

processing the first nonnegative intermediate signal through a leaky integrator to produce a second intermediate signal, and

processing the second intermediate signal through an inverting bistable device to produce the nonnegative binary signal, and

adaptively adjusting at least one of input signal range and sampling interval.

In the Specification

Please replace the last paragraph on page 9 of the application with the following paragraph:

An example of a tunable Fabry-Perot (FP) suitable for use as leaky integrator 514 is shown in Fig. 6. Suitable FPs are made by Micron Optics Technology, located at 1852 Century Place NE, Atlanta, GA 30345 ~~and are described at www.micronoptics.com/scientific_cust-components.htm, incorporated herein by~~

~~reference~~. In brief, an optical fiber 600 functions as an etalon and guides the light between the reflective ends (e.g., two independent mirrors) of the FP. With each bounce the laser light leaks out and thus the total light between the reflective ends decays in time. This exponential decay of optical density is in analogy with the leaky integrator function described above. The tunability of the FP etalon can be used to adapt the illustrated embodiment to accommodate various RF bands.